

What is EUROPA

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Overview

EUROPA 2.0 (E2) is a class library and tool set for building planners (and/or schedulers) within a Constraint-based Temporal Planning paradigm. Constraint-based Temporal Planning¹ (and Scheduling) is a paradigm of planning based on an explicit notion of time and a deep commitment to a constraint-based formulation of planning problems. This paradigm has been successfully applied in a wide range of practical planning problems and has a legacy of success in NASA applications including: observation scheduling for the Hubble Telescope [9], autonomous control of DS-1 [9], ground-based activity planning for MER [9], and autonomous control of EO-1 [9].

E2 is the successor of EUROPA [9] which in turn was based upon HSTS [9]. E2 offers capabilities in 3 key areas of problem solving:

1. **Representation.** E2 allows a rich representation for actions, states, resources and constraints that allows concise declarative descriptions of problem domains and powerful expressions of plan structure. This representation is supported with a high-level object-oriented modeling language for describing problem domains and data structures for instantiating and manipulating problem instances.
2. **Reasoning.** Algorithms are provided which exploit the formal structure of problem representation to enforce domain rules and propagate consequences as updates are made to the problem state. These algorithms are based on logical inference and constraint-processing. In particular, specialized techniques are included for reasoning about temporal quantities and relations.
3. **Search.** Problem solving in E2 requires search. Effective problem solving typically requires heuristics to make search tractable and to find good solutions. E2 provides a framework for integrating heuristics into a basic search algorithm and for developing new search algorithms.

E2 is not an end-user application. Rather, it is a means to integrate advanced planning, scheduling and constraint reasoning into an end-user application. E2 is not a specific planner or a scheduler. Rather it is a framework for developing specific planners and/or schedulers. It is designed to be open and extendable to accommodate diverse and highly specialized problem solving techniques within a common design framework and around a common technology core.

Current Users

Previous Users